

**PATENT**

**MS91212.01/MSFTP291US**

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Date: January 24, 2007

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of:

Applicant(s): Eric J. Horvitz

Examiner: William H. Wood

Serial No: 09/820,519

Art Unit: 2193

Filing Date: March 29, 2001

Title: METHODS AND APPARATUS FOR DOWNLOADING AND/OR  
DISTRIBUTING INFORMATION AND/OR SOFTWARE RESOURCES  
BASED ON EXPECTED UTILITY

**Mail Stop Appeal Brief - Patents**  
**Commissioner for Patents**  
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**APPEAL BRIEF**

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Dear Sir:

Appellant's representative submits this brief in connection with an appeal of the above-identified patent application. The commissioner is authorized to charge the requisite \$500 fee, to the credit card designated on the enclosed credit card payment form. In the event any additional fees are due in connection with this submission, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [MSFTP291US].

**I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))**

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

**II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))**

Appellant, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))**

Claims 1, 3-40 and 42-45 have been rejected by the Examiner. Claims 2 and 41 have been cancelled. The rejections of claims 1, 3-40 and 42-45 are being appealed.

**IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))**

No claim amendments have been entered after the Final Office Action.

**V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))****A. Independent Claim 1**

The invention as recited in independent claim 1 relates to downloading resources (*e.g.*, software components), and a distribution thereof among intermediate storage facilities or receivers, while considering different latencies of such storage facilities (*e.g.*, *see* page 16, lines 21-27 of the Specification); and/or optimizing such distribution (*e.g.*, *see* page 22, lines 9-15.) For example, a *cost of accessing* the resources in an *unloaded condition* is determined, (*e.g.*, *see* page 39, lines 20-22, page 50 lines 15-20) - to facilitate an intelligent installment and/or distribution of resources that conserves resources (*e.g.*, *see* page 105, lines 19-25). Hence, the probability of having to return to a CD-ROM resource during a life cycle of a product can be evaluated/determined, and an associated cost employed to make decisions regarding a download. (*See* page 39, lines 20-22). Moreover, a usage of the resources to be downloaded can be probabilistically

determined and ***request-to receive times*** that are associated with receipt of requested resource from the storage facilities are ***minimized***. (See page 22, lines 6-15). For example, in context of distributing software components across multiple storage facilities, the minimizing can be in form of moving resources in between slow and fast storage facilities, and can be inversely proportional to a size of the resource- (e.g., see page 22, lines 17-30.)

**B. Independent Claim 15**

Independent claim 15 recites means for ***intelligently downloading*** resources to intermediate storage facilities based on a probability of use of such resources, wherein such downloaded resources are optimally distributed over the intermediate storage facilities, (e.g., see page 1, lines 5-15; see also page 22 lines 5-15.) Moreover, an expected “value” of downloaded resources can be maximized by evaluating resources and users of such resources; (e.g., see page 18 lines 17-20; see also page 50 lines 15-20.) For example, in one aspect and regarding distribution of software component across multiple storage facilities, the value can relate to minimizing expected costs over population of users; (e.g., see page 22, lines 18-30).

Moreover, distribution of the downloaded resources can be optimized over the intermediate storage facilities such that the total request to receive time is minimized; (e.g., see page 28, lines 20-24); and a ***cost of accessing*** the resources in a ***non-downloaded condition*** is determined, (e.g., see page 39, lines 20-22, page 50 lines 15-20) - to facilitate an intelligent installment and/or distribution of resources that conserves resources (e.g., see page 105, lines 19-25). The “means for” limitations described above are identified as limitations subject to the provisions of 35 U.S.C. §112 ¶6. Exemplary corresponding structures are identified with reference to the specification in the parentheticals above, which correspond to respective claim limitations.

**C. Independent Claim 16**

The subject invention as recited in independent claim 16 relates to a method of downloading resources, while maximizing an expected value of downloaded resources, (*e.g.*, *see* page 18 lines 17-20; *see also* page 50 lines 15-20); and changing a storage capacity of the intermediate storage facility (which the resources are downloaded therein) based on a change of the expected value of the downloaded resources (*e.g.*, *see* page 25 lines 15-21; *see also* page 50 lines 15-20). Accordingly, distribution of resources can be optimized among the storage facilities (*e.g.*, *see* page 22, lines 9-15.)

**D. Independent Claim 17**

The invention as recited in independent claim 17 relates to a method of downloading resources, while changing a storage capacity of the intermediate storage facility based on a value and cost associated therewith; (*e.g.*, *see* page 25 lines 15-21.) Moreover, a *cost of accessing* the resources in an *unloaded condition* is determined, (*e.g.*, *see* page 39, lines 20-22, page 50 lines 15-20) - to facilitate an intelligent installment and/or distribution of resources that conserves resources (*e.g.*, *see* page 105, lines 19-25).

**E. Independent Claim 22**

Independent claim 22 recites a method of distributing resources among storage facilities by minimizing total expected request-to-receive times *via* utilization of the user-based factor (*e.g.*, user type classes, usage type classes, probabilities that a user belongs to the various user type classes), the resource-based factor (*e.g.*, application classes, determining type of component such as core/optional component; usage statistics), and the storage facility-based factors (*e.g.*, size and latencies for various storage facilities) (*e.g.*, *see* page 11, lines 10-25, page 77, lines 24-26.) Moreover, a change of capacity (*e.g.*, increase or decrease) of the storage facilities can initiate based on the minimizing act, such as an associated change in value or cost; (*e.g.*, *see* page 19, lines 1-5.)

**F. Independent Claim 32**

The invention as recited in independent claim 32 relates to a method of distributing resources among at least two storage facilities, by determining for each resource a value density in a knapsack approximation procedure, which is based on a change in value of storing the resource on a first storage facility, as compared to storing such resource on the second storage facility (*e.g.*, *see* page 88 lines 24; *see also* page 67 line 20; *see* page 88 lines 24 to page 89 line 5, *see also* page 69 lines 4-6; and *see also* page 78 lines 15 to page 79 line 8.) Moreover, given a total size of resources being less than the finite available capacity of the first storage facility, the subject invention maximizes a total value density; (*e.g.*, *see* page 12 lines 3-6; *see also* page 13 lines 2-7, *see* page 25 lines 15-21; *see* page 27 lines 10-15.)

**G. Independent Claim 39**

Applicant's claimed invention as recited in independent claim 39 relates to ***intelligently downloading*** resources to intermediate storage facilities (*e.g.*, *see* page 1, lines 5-15; *see also* page 22 lines 5-15.) For example, distribution of the downloaded resources can be optimized over the intermediate storage facilities such that the total request to receive time is minimized; (*e.g.*, *see* page 28, lines 20-24). In addition, distribution of the downloaded resources can be optimized over the intermediate storage facilities, such that the total request to receive time is minimized; (*e.g.*, *see* page 28, lines 20-24). Moreover, a ***cost of accessing*** the resources in a ***non down-loaded condition*** is determined, (*e.g.*, *see* page 39, lines 20-22, page 50 lines 15-20) - to facilitate such intelligent installment and/or distribution of resources that conserves resources (*e.g.*, *see* page 105, lines 19-25). The "means for" limitations described above are identified as limitations subject to the provisions of 35 U.S.C. §112 ¶6. Exemplary corresponding structures are identified with reference to the specification in the parentheticals above, which correspond to respective claim limitations.

#### **H. Independent Claim 40**

Applicant's claimed invention as recited in independent claim 40 relates to downloading resources to intermediate storage facilities, wherein such downloaded resources are optimally distributed over the intermediate storage facilities, (*e.g.*, *see* page 1, lines 5-15; *see also* page 22 lines 5-15.) Such distribution of the downloaded resources can be optimized over the intermediate storage facilities, such that the total request to receive time is minimized; (*e.g.*, *see* page 28, lines 20-24); and a ***cost of accessing*** the resources in a ***non-downloaded condition*** is determined, (*e.g.*, *see* page 39, lines 20-22, page 50 lines 15-20) - to facilitate an intelligent installment and/or distribution of resources that conserves resources (*e.g.*, *see* page 105, lines 19-25).

#### **VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))**

**A.** Whether claims 1, 3, 5-8, 10, 15-19 and 21 are properly rejected under 35 U.S.C. §102(b) as being anticipated by Robinson (US Patent 5,918,014).

**B.** Whether claim 4 is properly rejected under 35 U.S.C. §103(a) as being obvious over Robinson.

**C.** Whether claims 9, 11, 12 and 20 are properly rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.* (US Patent 5,925,100).

**D.** Whether claims 13 and 14 are properly rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.*, and in further view of Cherkasova *et al.* (US Patent 6,425,057).

**E.** Whether claims 22-31, 39, 40 and 42-45 are properly rejected under 35 U.S.C. §103(a) as being obvious over Robinson and Drewry *et al.* in view of Cherkasova *et al.* and further in view of Fischer *et al.* (US Patent 6,438,672).

F. Whether claims 32-38 are properly rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.*, in view of Cherkasova *et al.* and further in view of Fischer *et al.* in further view of Ganz *et al.* (US Patent 6,049,549).

## VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

### A. Rejection of Claims 1, 3, 5-8, 10, 15-19 and 21 Under 35 U.S.C. §102(b)

Claims 1, 3, 5-8, 10, 15-19 and 21 stand rejected under 35 U.S.C. §102(b) as being anticipated by Robinson (US Patent 5,918,014). Reversal of this rejection is respectfully requested for at least the following reasons. Robinson does not teach or suggest applicant's claimed invention.

For a prior art reference to anticipate, 35 U.S.C. §102 requires that "each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950 (Fed. Cir. 1999) (quoting *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2USPQ2d 1051, 1053 (Fed. Cir. 1987)).

Contrary to assertions made in the Advisory Action, the limitation of "determining and/or evaluating a *cost of accessing/returning* to the resources in an *unloaded condition*", does appear in independent claims 1, 15, and 17 of the subject invention. Independent claim 1 recites "evaluating a *cost of accessing resources in unloaded condition*", and independent claim 15 recites "means for evaluating a cost to *retrieve resources in a non-downloaded condition.*" Also, the limitation of "*determining a cost of accessing* a resource in an *unloaded condition*" is recited in independent claim 17.

Applicant's claimed invention in part is directed to methods and systems of downloading /distributing resources (*e.g.*, software components) among intermediate storage facilities and/or receivers, wherein a *cost of accessing/returning* to the resources in an *unloaded condition* is determined (*e.g.*, *see* page 39, lines 20-22, page 50 lines 15-20). For example, the probability of having to return to a CD-ROM resource during a life

cycle of a product can be evaluated/determined, and an associated cost employed to make decisions regarding a download. (See page 39, lines 20-22). Also, the claimed invention further enables changing a ***constraint associated with the intermediate storage*** facility, based on an associated change in value and cost. For example, a read access time or capacity of such intermediate storage facility can be changed, based on an associated variance in value and cost (e.g., see page 28, lines 20-24). As such, an intelligent installment/distribution of resources can be provided, which conserves storage resources (e.g., see page 1, lines 5-15; see also page 22 lines 5-15.) Such aspects of applicant's claimed invention are not taught or suggested by Robinson.

Rather, Robinson is directed to showing new ads to different people (typically without a request being made for such new ads), based on their past activities. Robinson tracks activities of a subject in an interactive medium to determine which advertisement to present to the user. Robinson does not teach or suggest: “minimizing ***request-to-receive time***”; or “evaluating a cost of ***changing a constraint*** associated with the intermediate storage facility,” and “***returning to resources in unloaded condition***”; as in applicant's claimed invention. In particular, there logically exists a distinction between “cost of ***not accessing*** a resource” as purportedly disclosed in Robinson – versus – “cost of ***accessing*** a resource in an ***unloaded condition***”, as in the claimed invention.

Independent claim 1 recites “distributing [...] ***to minimize total request-to-receive time***”, and “evaluating a ***cost of accessing resources in unloaded condition***”. Likewise, independent claim 15 recites “means for optimizing distribution over intermediate storage facilities ***to minimize total request-to-receive times***”, and “means for evaluating a cost to ***retrieve resources in a non-downloaded condition***.” Also, the limitations of “***changing a storage capacity of the intermediate storage***”, and “***determining a cost of accessing*** a resource in an ***unloaded condition***” are respectively recited in independent claims 16 and 17.

In view of the at least above comments it is readily apparent that Robinson does not teach or suggest the subject invention as recited in independent claim 1 (and claims 3, 5-8, 11, 13, 14 dependent therefrom), independent claim 15, independent claim 16, independent claim 17 (and claims 18-20 dependent therefrom). Reversal of this rejection is respectfully requested.



**B. Rejection of Claim 4 Under 35 U.S.C. §103(a)**

Claim 4 stands rejected under 35 U.S.C. §103(a) as being obvious over Robinson (US Patent 5,918,014). Claim 4 depends from independent claim 1, and as explained *supra* Robinson does not teach or suggest the invention as recited in independent claim 1. Reversal of this rejection is respectfully requested.

**C. Rejection of Claims 9, 11, 12 and 20 Under 35 U.S.C. §103(a)**

Claims 9, 11, 12 and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.* (US Patent 5,925,100). Claims 9, 11, 12 depend from independent claim 1, and claim 20 depends from independent claim 17. As explained *supra*, Robinson does not teach or suggest applicant's invention as recited in the subject independent claims, and Drewry *et al.* fails up to make for the aforementioned deficiencies of Robinson with respect to such independent claims. Reversal of this rejection is respectfully requested.

**D. Rejection of Claims 13 and 14 Under 35 U.S.C. §103(a)**

Claims 13 and 14 stand rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.* in further view of Cherkasova *et al.* (US Patent 6,425,057). Claims 13, 14 depend from independent claim 1, and Drewry *et al.* in view of Cherkasova *et al.* fail to make up for the aforementioned deficiencies of Robinson with respect to independent claim 1. Reversal of this rejection is respectfully requested.

**E. Rejection of Claims 22-31, 39, 40 and 42-45 Under 35 U.S.C. §103(a)**

Claims 22-31, 39, 40 and 42-45 stand rejected under 35 U.S.C. §103(a) as being obvious over Robinson and Drewry *et al.* in view of Cherkasova *et al.* and further in view of Fischer *et al.* (US Patent 6,438,672).

Independent claim 22 recites “*minimizing* total expected request to receive time [...] and *changing a storage* space associated with the intermediate storage facility, based on the *minimizing act*.” As explained earlier, such aspects of the claimed invention are not taught or suggested by Robinson. Moreover, Drewry *et al.* and

Cherkasova *et al.* in view of Fischer *et al.* fail to make up for the aforementioned deficiencies of Robinson with respect to independent claim 22.

Likewise, independent claim 39 recites “means for evaluating a cost to return to resources in non-downloaded condition”, and independent claim 40 recites “determining a cost of ***returning to resources in an unloaded condition***”; as explained earlier Robinson fails to teach or disclose such aspects of the claimed invention. Furthermore, Drewry *et al.* and Cherkasova *et al.* in view of Fischer *et al.* fail to make up for the aforementioned deficiencies of Robinson with respect to independent claims 39 and 40.

In view of the at least above comments it is readily apparent that the cited references do not teach or suggest the subject invention as recited in independent claim 22 (and claim 23-31 dependent therefrom), independent claim 39, and independent claim 40 (and claims 42-45 dependent therefrom). Reversal of this rejection is respectfully requested.

**F. Rejection of Claims 32-38 Under 35 U.S.C. §103(a)**

Claims 32-38 stand rejected under 35 U.S.C. §103(a) as being obvious over Robinson in view of Drewry *et al.*, in view of Cherkasova *et al.* and further in view of Fischer *et al.* in further view of Ganz *et al.* (US Patent 6,049,549).

Independent claim 32 recites “***a first determining*** a probability [...] ***a second determining*** [...] ***a change in value of*** storing the resource on a first storage facility versus [...] a second storage facility; determining, a ***change in cost of*** storing the resource on the first storage facility versus storing the resource on the second storage facility; determining, for each resource, a value density in a knapsack approximation procedure based on the change in value *via the first determining act and the second determining act*[...]”. Accordingly, the knapsack approximation procedure of the subject innovation is based on the first and second determining act.

Such aspects of the claimed invention are not taught or suggested by the knapsack procedure of Ganz *et al.*, which merely discloses existence of such procedure, and applies it to a capacity distribution of a communication system. Moreover, Robinson in view of Drewry *et al.*, and in view of Cherkasova *et al.* and further in view of Fischer *et al.* fail to

make up for the aforementioned deficiencies of Ganz *et al* with respect to independent claim 32.

Moreover, the Office Action relies on improper motivation to combine and/or modify the references. In general, the rationale proffered is to achieve benefits identified in applicant's specification, which overcome problems associated with conventional systems/methods. Applicant's representative respectfully submits that such rationale is an unacceptable and improper basis for a rejection under 35 U.S.C. §103. In essence, the Examiner is basing the rejection on the assertion that it would have been obvious to do something not suggested in the art because so doing would provide advantages stated in applicant's specification. This has been condemned by the CAFC. *See, for example, Panduit Corp. v. Dennison Manufacturing Co.*, 1 USPQ2d 1593 (Fed. Cir. 1987). It is noted that even if the references are combined, applicant's claimed invention does not result. Reversal of this rejection is respectfully requested.

**G. Conclusion**

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1, 3-40 and 42-45 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Respectfully submitted,  
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**VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))**

1. A computer implemented method for downloading resources, from a source to an intermediate storage facility(ies), having a finite storage capacity, the computer implemented method comprising:

determining a probability of using a resource, the probability in part determined *via*;

accepting at least one user-based factor;

accepting at least one resource-based factor;

maximizing an expected value of downloaded resources *via* utilization of the at least one user-based factor and the at least one resource-based factor;

distributing downloaded resources among a plurality of storage facilities to minimize total request-to-receive time, and

evaluating a cost of accessing resources in an unloaded condition.

2. (Previously Cancelled.)

3. The method of claim 1 further comprising determining probabilities that a user belongs to various user type classes.

4. The method of claim 3 wherein the probabilities that a user belongs to various user type classes are determined based on evidence using a Bayesian network.

5. The method of claim 3 wherein the at least one resource-based factor includes probabilities that users of the various user type classes will use the resource at least once.

6. The method of claim 1 wherein the at least one resource-based factor includes probabilities that users of various user type classes will use the resource at least once.

7. The method of claim 3, wherein the at least one resource-based factor is a probability that the resource will be used at least once and is based on a sum, over all user type classes, of a product of :

a probability that the resource is used at least once, given that an application to which the resource belongs is used at least once, by a user of the user type class;

a probability that the application to which the resource belongs is used at least once by a user of the user type class; and

a probability that the user belongs to the user type class.

8. The method of claim 1 wherein the at least one resource-based factor includes an association of each of the resources to at least one application class.

9. The method of claim 8 wherein the at least one resource-based factor includes an indication, for each of the resources, of whether the resource is a core component or an optional component of the application class with which it is associated.

10. The method of claim 1 wherein the act of maximizing an expected value of downloaded resources includes maximizing an expected value density of downloaded resources.

11. The method of claim 1 wherein the act of maximizing an expected value of downloaded resources includes minimizing an expected cost of not having a needed resource.

12. The method of claim 11 wherein the expected cost of not having a needed resource is based on one of enhancement rates of the resources and value densities of the resources.

13. The method of claim 12 wherein the enhancement rate of a resource is based on the size of the resource, a probability of that resource being used at least once, and a cost of later downloading the resource.

14. The method of claim 12 wherein the value density of a resource is based on the size of the resource and the probability that the resource will be used at least once.
15. A computer executable system for downloading resources, comprising:  
means for storing at least one user-based factor and at least one resource-based factor;  
means for maximizing an expected value of downloaded resources *via* utilization of the user-based factor and the resource-based factor;  
means for intelligently downloading a resource based on a probability of use to intermediate storage facilities,  
means for optimizing distribution over intermediate storage facilities to minimize total request-to-receive times, and  
means for evaluating a cost to retrieve resources in a non-downloaded condition.
16. A computer implemented method of downloading a resource to an intermediate storage facility comprising:  
accepting at least one user-based factor;  
determining a probability of use for a resource by a user in a user type class;  
accepting at least one resource-based factor;  
maximizing an expected value of downloaded resources *via* utilization of the at least one user-based factor and the at least one resource-based factor, and  
changing a storage capacity of the intermediate storage facility based on a change of the expected value.

17. A computer implemented method for installing software components, each having a size, from a source to an intermediate storage facility, the method comprising:

predicting an expected frequency of use for a software component, in part *via*:

accepting at least one user-based factor;

accepting at least one component-based factor; and

changing a storage capacity of the intermediate storage facility based on a value and cost associated therewith, and

determining a cost of accessing a resource in an unloaded condition.

18. The method of claim 17 wherein the at least one user-based factor includes probabilities that a user is member of various user type classes.

19. The method of claim 17 wherein the at least one component-based factor includes an association of each of the software components to one of a plurality of application classes.

20. The method of claim 19 wherein the at least one component-based factor further includes an indication, for each of the software components, of whether the software component is a core component or an optional component of the application class with which it is associated.

21. The method of claim 20 wherein the at least one component-based factor further includes probabilities that each of the software components will be used at least once by users of various user type classes.



22. A computer implemented method for distributing resources, each having a size, among at least two storage facilities, the method comprising:
- accepting at least one user-based factor;
  - accepting at least one resource-based factor;
  - accepting at least one storage facility-based factor;
  - accepting probabilistic relationships between user based factors and resource based factors;
  - minimizing total expected request to receive time *via* utilization of the user-based factor, the resource-based factor, and the storage facility-based factor; and
  - changing a storage space associated with the intermediate storage facility, based on the minimizing act.
23. The method of claim 22 wherein the at least one user-based factor includes probabilities that a user belongs to various user type classes.
24. The method of claim 23 further comprising determining the probabilities that a user belongs to various user type classes.
25. The method of claim 24 wherein the probabilities that a user belongs to various user type classes are determined based on evidence using a Bayesian network.
26. The method of claim 23 wherein the at least one resource-based factor includes frequencies at which users of the various user type classes will use each of the resources.
27. The method of claim 26 wherein the at least one storage facility-based factor includes an available capacity of each of the two storage facilities and a relative request-to-receive latency of each of the two storage facilities.

28. The method of claim 27 wherein the total expected latencies is a function of the frequencies at which users of the various user type classes will use each of the resources, and a difference between the relative request-to-receive latencies of the two storage facilities.

29. The method of claim 22 wherein the at least one storage facility-based factor includes an available capacity of each of the two storage facilities and a relative request-to-receive latency of each of the two storage facilities.

30. The method of claim 22 wherein the total expected latencies to request and receive resources is minimized based on value densities of the resources.

31. The method of claim 30 wherein the value densities of the resources are based on the frequency of use of the resources and a difference in request to receive latencies between the at least two storage facilities.

32. A computer implemented method for distributing resources, each having a size, among at least two storage facilities, each of the storage facilities having a finite available capacity, the method comprising:

- a first determining a probability of using a resource by a composite user;
- a second determining, for each resource, a change in value of storing the resource on a first storage facility versus storing the resource on a second storage facility;
- determining, for each resource, a change in cost of storing the resource on the first storage facility versus storing the resource on the second storage facility;
- determining, for each resource, a value density in a knapsack approximation procedure based on the change in value *via* the first determining act and the second determining act; and
- maximizing a total value density given a total size of resources being less than the finite available capacity of the first storage facility.

33. The method of claim 32 wherein the value of storing a resource on the first storage facility is a function of a perceived utility of such storage, per request for the resource, and a frequency of requests for the resource.
34. The method of claim 33 wherein the perceived utility of such storage, per request for the resource, is a function of a request-to-receive time delay.
35. The method of claim 34 wherein the request-to-receive time delay is a function of at least one of:
- a storage device read access time,
  - a network speed,
  - a network latency, and
  - the size of the resource.
36. The method of claim 35 wherein the network speed is a function of a user configuration.
37. The method of claim 33 wherein the frequency of requests for the resource is a function of a user type class and a number of users belonging to the user type class.
38. The method of claim 32 wherein the cost of storing a resource on the first storage facility is a function of the resource size.
39. A computer implemented system for distributing resources, each having a size, among at least two storage facilities, each of the storage facilities having a finite capacity and a request-to-receive latency, the system comprising:
- storage means for storing at least one user-based factor, at least one resource-based factor, and at least one storage facility-based factor;
  - means for minimizing total expected latencies to request and receive resources,
  - means for intelligently downloading resources; and
  - means for evaluating a cost to return to resources in non-downloaded condition.

40. A computer implemented method of downloading a resource(s) to an intermediate storage facility comprising:

accepting at least one user-based factor;

accepting at least one resource-based factor;

accepting at least one storage facility-based factor;

accepting probabilistic relationships between the at least one-user based factor and the at least one resource based factor;

minimizing total expected latencies to request and receive resources, and

determining a cost of retuning to resources in an unloaded condition.

41. (Previously Cancelled.)

42. The method of claim 40 further comprising changing a storage capacity of the storage medium based on at least one of a change in value and cost.

43. The method of claim 42 further comprising changing the storage capacity when a ratio of value to cost is greater than one.

44. The method of claim 43 wherein the at least one user-based factor is a function of a time offline until the intermediate storage facility is reconnected with a source.

45. The method of claim 44 wherein the time offline is a probability distribution considering at least one of:

a resource context,

a user type class, and

a recent usage pattern.

**IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))**

None.

**X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))**

None.